

REMARKS

By amendment herewith, Claims 1, 3, 5, 6, 8-10, 13, 14, 19, 22, 24-26, 31, 32, 34, 48, 51 and 52 are being changed, Claims 2 and 4 are being cancelled, and new Claims 59-62 are being added. None of the amendments introduce new matter, and all of the amendments are made without prejudice to or disclaimer or dedication of any subject matter, and a right is specifically reserved to file continuation and/or divisional applications claiming any subject matter disclosed in the application. After entry of the amendments, Claims 1, 3, 5-14, 19-29, 31, 32, 34, 35, 41-46, 48, 51-58 and 59-62 are pending for examination.

Independent Claim 1 recites certain features previously recited in Claims 2, 4 and 26. Independent Claims 1, 55 and 59 each involves remedial treatment to extract additional component from a heap that has already been subjected to component extraction from prior heap leaching, with the remedial treatment being selective as to an identified portion or portions of the heap identified, from analyzing data comprising geophysical survey data, to be deficient in extraction of the component in that following the prior heap leaching the extraction of the component in the identified portion is low in comparison to average extraction of the component from the heap. After the identified portion of the heap has been hydraulically fractured through a well, treating solution is introduced through the well into the identified portion of the heap for component dissolution. The claimed subject matter is focused on selective remedial treatment, following prior heap leaching, using geophysical survey data from the heap to help identify deficiently-leached portions of the heap that may then be selectively remediated through targeted hydraulic fracturing and further leaching selectively directed to the identified deficiently-leached portions of the heap, thus permitting the avoidance of cost and operational complexity of a whole-heap extraction approach involving a non-selective grid pattern of wells, hydraulic fracturing for whole-heap coverage and a leach fluid distribution system to all such wells. Benefits of operational simplicity of traditional surface application of leach liquid application may be realized with the more extensive remedial treatment operative being reserved for use only on a selective basis. Contrary to prior assertions by the Examiner, such claimed subject matter is not obvious over Hannifan et al. (US 3,441,316) in view of Yan (US 4,346,936), in view of

Spedden et al. (US 3,815,957) and further in view of Lesty et al. (US 4,756,887). Remarks directed to each of these references have been previously provided, and the following additional remarks are provided for the Examiner's consideration.

Hannifan et al. is directed only to a non-selective, whole-heap operation performed through a grid of wells. Yan discloses the use of wells only into in-situ formations for in-situ operations, and makes no disclosure at all of wells used for any purpose in heaps, and even in this in-situ context Yan discloses only non-selective operation performed through a grid of wells. Each of Spedden et al. and Lesty et al. disclose the use of wells in relation to different processes for recovering a component from an in-situ mineral formation, or a heap or dump of material, with Lesty et. al. directed particularly to heap operations, but each only in the context of a non-selective, whole-heap/formation operation.

Not even considering issues with the combinability of the different particular teachings of these four references, the Examiner has noted several deficiencies in the references that are dealt with in a piece-meal fashion and not in the context of the whole of the claimed subject matter. For example, the Examiner has identified at least the following deficiencies in the teachings of these references:

1. "Hannifan does not teach selective remedial treatment of identified portions of the heap determined form [sic] surveying to be deficient in extraction of the component" (11/10/209 Office Action, page 3). The Examiner attempts to address this recognized deficiency only by asserting a conclusion that it would be obvious to do so based presumably on knowledge that heaps may contain deficiently-leached areas and that the use of wells selectively into those areas would be obvious. There is no reasonable basis for such a conclusion. Hannifan et al. clearly disclose that traditional surface application heap leach operations are as-a-whole deficient and undesirable for a variety of reasons (Hannifan et al. column 1, lines 47-63), and there is no teaching, suggestion or motivation provided by Hannifan et al. that would lead to a conclusion that alleviating this as-a-whole deficiency may be accomplished other than through completely replacing the traditional leach

operation, and indeed Hannifan suggests otherwise (see, for example, Hannifan et al., at column 2, lines 7-9).

2. "Hannifan does not teach surveying comprising collecting data concerning properties within the heap and analyzing the data to identify portions of the heap deficient in component extraction" (1/12/2009 Office Action, page 4). The Examiner attempts to address this recognized deficiency through citation to Yan and an assertion that "core samplings can be taken from already partially leached ores to calculate the proper molar ratio used for a pre-leaching treatment", citing to column 2, lines 58-64 of Yan. Such an assertion is not supported by the disclosure of Yan, and especially not in the portion of Yan cited by the Examiner. The citation to column 2, lines 58-64 spans the last sentence of a paragraph that is concluding a discussion on the topic of pretreatment prior to leaching (column 2, lines 58-61) and the first sentence of new paragraph that commences discussion of the different topic of stimulation after leaching (column 2, lines 62-64). These two portions of the citation are not logically connected as suggested by the Examiner. The first portion of the citation (concerning the preleach) is directed to determining a proper molar ratio of CO<sub>2</sub>/O<sub>2</sub> gas for the pretreatment "on the basis of core samplings of the formation to be leached" (emphasis added), clearly indicating that the referenced "core samplings" are in a condition prior to leaching, not after leaching as suggested by the Examiner's assertion. The second portion of the citation (concerning the new topic of post-leaching stimulation) states that a similar CO<sub>2</sub>/O<sub>2</sub> gas mixture may also be used to stimulate leaching from already partially leached ores, and then refers to "one experiment conducted in the laboratory using core samples from a South Texas uranium field". The reference to the "core samples" in the second portion of the citation is independent of and not related to the reference to "core samplings" in the first portion of the cited reference, and there is no indication or suggestion in Yan that the "core samples" referenced in the second portion of the citation were analyzed following initial leaching for setting the CO<sub>2</sub>/O<sub>2</sub> ratio for the

stimulation treatment, or for any other purpose. The only reference to determining a molar ratio is based on core samplings “of the formation to be leached” as stated in the first portion of the citation. There is no basis for, and the text and context of the Examiner’s citation to Yan is actually contrary to, the Examiner’s assertion that “core samplings can be taken from already partially leached ores to calculate the proper molar ratio used for a pre-leaching treatment” (emphasis added). There is no teaching in Yan that teaches, suggests or motivates analyzing data concerning the in-situ formations being treated by Yan (let alone concerning heaps) to identify deficiently leached areas, for any purpose, let alone for a purpose of identifying areas for remedial treatment.

3. “Hannifan does not teach hydraulic fracturing of the heap before the well treatment” (11/10/2009 Office Action, page 5). The Examiner attempts to address this recognized deficiency through citation to Spedden et al. However, Spedden et al. discloses hydraulic fracturing for use only in a non-selective, systematic use of injection and recovery wells. There is no teaching, suggestion or motivation in Spedden et al., or other references relied upon by the Examiner, of use of hydraulic fracturing as part of a selective remedial heap treatment, let alone in the particular process combinations of the claims.
4. “Hannifan does not teach noninvasive data collection techniques to determine properties of the heap” (11/10/2009 Office Action, page 10). The Examiner attempts to address this recognized deficiency through citation to Lesty et al., and in particular to a cited passage of Lesty et al. at column 3, lines 14-18 where Lesty et al. reference “geophysical methods”. However, similar to Hannifan, Spedden et al. teach that traditional heap leaching is as-a-whole undesirable for a variety of reasons (e.g., at column 1, lines 24-35) and teaches instead the whole-heap use of a grid of wells in a non-selective manner. There is no disclosure in Lesty et al. that teaches that the selective remedial use of wells would address the as-a-whole

undesirability of traditional heap leaching. With respect to the reference to "geophysical methods", as discussed in a previous response, it is clear that the reference is only in relation to permeability determinations in the heap to help determine well spacing for whole-heap injection coverage. There is no teaching, suggestion or motivation of the use of geophysical survey data for purposes of helping to identify deficiently-leached portions of a heap following prior heap leaching operations or using such data for identifying portions of the heap for remedial treatment in any manner, let alone using the particular processing combinations of the claims.

The claims include a particular relationship and sequence between prior heap leaching, geophysical survey data analysis for identifying deficiently-leached portions of the heap and selective remedial treatment performed after prior heap leaching, with introduction of treating solution into such an identified portion through a well following hydraulic fracturing. Clearly, Hannifan et al., Yan, Spedden et al. and Lesty et al. do not even make out a *prima facie* case of obviousness of the claimed subject matter. The claims are believed to be in condition for allowance and allowance of all pending claims is earnestly requested. If the Examiner believes that it would be helpful to discuss any of the amendments or remarks presented, or to discuss possible Examiner amendments, the Examiner is respectfully invited to contact the undersigned at the telephone number provided below.

Respectfully submitted,

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